

“AUTOMATISED ASSEMBLY OPERATING UNIT IN PARTICULAR FOR  
AEROSOL APPLIANCES”

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Field of invention

5           The invention concerns an operating unit, such as a pump or compressor integrated with a motor and a fan, usable in particular, but not exclusively, to generate a flow of air under pressure in aerosol therapy appliances.

State of the art

10           The operating unit taken into consideration usually comprises a pump or compressor group with a relative head, an electric control motor and a fan for the motor. The pump group is placed in a body or shell and its head has an air inlet duct, an air outlet duct towards the user unit and at least one switch for starting and stopping the unit.

15           In the more traditional units, assembly of one such operating unit in the body or shell requires the provision of a series of passages for the air and wiring for the electric motor, operations to be carried out manually and which however prevent or at least hinder automizable assembly, that is to say, mechanised, of the group.

20           According to a previous patent for a utility model by the same applicant, the electric motor is integral with the pump or compressor and is assembled in

the body or shell with the interposition of suspension elements, to damper and reduce vibration and noise. For this purpose, the motor is equipped with two supporting flanges, each one shaped to form two extensions facing in opposite directions, and at the ends of said extensions caps or damper  
5 bearings are applied which fit into corresponding seats inside the body or shell.

Even this innovative aspect, however, although improving the suspension system of the operating unit in the body, is not able to provide the conditions for automatizing the assembly of the group.

#### 10 Object and Summary of the Invention

Given the above premise, it is however the object of this invention to create the conditions, through a particular arrangement and combination of elements, so that assembly of the abovementioned type of operating unit is in fact automizable, that is to say mechanised, so as to reduce the use of labour,  
15 time and production costs.

Said object is achieved, according to the invention, with an operating unit to generate a flow of air under pressure in aerosol therapy equipment comprising a pump group that includes a head, and electric motor and a fan, a body that houses said pump group and is made up of two shells which  
20 overlap and join on a transversal plane by means of edges shaped to fit automatically one into the other, and where the head of the pump group has an inlet duct equipped with a filter and an air outlet duct, and the motor is equipped with suspension elements in said body and connected electrically to a power socket and to a switch supported by a plate with a fuse, characterised  
25 by the fact that the shells forming said body have means for receiving and

holding the air inlet duct with filter, the air outlet duct and plate with fuse, power socket and switch, following their superimposition for an automated assembly of the group.

#### Brief description of the drawings

5 Further details of the invention will be more apparent from the following description made in reference to the enclosed, indicative and non-limiting drawings, in which:

Fig.1 shows an exploded view of the components of the operating unit;

10 Figs. 2 and 3 show two views in perspective from opposite sides of the assembled unit;

Fig.4 shows a view from above of the unit in Fig. 2;

Figs. 5 and 6 show two views from the front and side of the unit;

Fig. 7 shows an enlarged view of a cross-section according to arrows A-A in Fig. 5;

15 Fig. 8 shows an enlarged detail of Fig. 7 in correspondence with the air inlet duct with filter; and

Fig. 9 shows a variation of the operating unit where the body has a tool holder compartment.

#### Detailed description of the Invention

20 As shown, the operating unit comprises fundamentally a body 11 and a pump group 12 enclosed in said body and designed to generate a flow of air under pressure.

The body 11 is made up of two elements or shells, one bottom 13 and one top 14, which superimpose and join on a transversal plane 15, at the level  
25 of their edges 13', 14' shaped to fit into each other, being self-centring. The

bottom shell 13 is equipped with base legs 16. Internally both shells 13, 14, forming the body have seats 17 for assembling the pump group 12. The two shells 13, 14 are fixed to each other, for example, by means of screws 18 inserted through the bottom shell and engaging corresponding holes provided, although not shown, in the top shell. The two shells 13, 14, can also be fixed in some other way without changing the objective of the invention.

The pump group 12 has a head 19, and electric motor 20 and a fan 21 for the motor joined to form a group that does not require ducts to be provided but only electric power connection for the motor.

10 The head 19 of the pump group has an air inlet duct 22 and an outlet duct 23. In the air inlet duct 22 is positioned, for example, a polymeric filter 24 or some other type of material, which is interchangeable from the outside. The filter 24 is fitted tightly in the inlet channel 22 and has a longitudinal cavity 24'', the internal end of which is associated with a pin 22' which partially occupies  
15 the cross section as shown in the detail in Fig. 8, with the advantage that it reduces noise.

The motor 20 is powered by means of electric cables 25, connected to a socket 26 and a switch 27 and a safety fuse – not shown- assembled on a plate 28. Furthermore, the motor has two supporting flanges each with two  
20 extensions 29 facing in opposite directions and which fit into corresponding seats 17 inside the two shells 13, 14 of the body or frame, each with interposition of a damper cap or bearing 30, as described in the abovementioned model of the same applicant.

In the example illustrated, the air inlet duct 22 protrudes from a lateral,  
25 vertical side of the head 19 of the pump group, whereas the air outlet duct 23

extends from the top horizontal side of said head 19, therefore at right angles to each other.

According to this arrangement, the mating edges 13', 14' of the two shells 13, 14 of the body 11 have, on one of their parts, two recesses, forming  
5 together, when the body is closed, a lateral seat 31 to receive the inlet duct 22 with interposition of a seal 32 and, in another of their parts, two slots to form, when the body is closed, a lateral opening 33 to receive and hold the socket, the switch and the plate with fuse for connecting the motor to the electric power supply. At the same time, the top shell 14 has a recess at the top with a  
10 hole 34 in the bottom to receive the air outlet duct 23, it also being fitted with a seal 35.

With the basic elements, that is to say the body 11 and the pump group 12, configured in this way, assembly of the operating unit can be carried out automatically using mechanical means, fundamentally as a pack -Fig. 1. This  
15 is carried out by positioning the group 12 in a first shell, placing the other shell on top of it so that, the air inlet duct 22 fits into its lateral seating 31, the socket and switch in the lateral opening 33 fits between the matching edges of the two shells and the air outlet 23 and relative seal in hole 34 at the top of the upper shell, and lastly by fixing the two shells together.

20 When the assembly has been effected, the air inlet duct 22 housing the filter 24 appears accessible on a side of the body -Figs. 2 and 5-, the socket 26 and the switch 27 on another side of the body -Fig. 3- and the air outlet duct 23 on the top of the body itself -Figs. 2 and 3 - to insert an air delivery tube to the use facility. Filter 24 is, in this way, removable, operating from the

outside of the body or shell by means of a tool to extract it through a slot 31' radially oriented to the seating 31 it is in.

Of particular importance – Figs 1 and 7- is that inside the lower shell 13 of the body 11, on an axis with a foot on the base 16, there is a protrusion 36 acting as a support for the bottom part of the head 19 of the pump group 12. 5 The protrusion 36 extends until it is up against the compressor or pump where it unites with a centring pin 19' with interposition of a damper element 37 and so as to be fundamentally in line and in front of the air outlet duct 23 in the top part – Fig. 7. This feature enables absorption, without causing any adverse 10 effects, of the force applied on the outlet duct 23 when the air delivery tube to the use facility, is connected.

Differently from what has been described above, in a variation in the construction, where they are in right angle planes, the air input duct and output duct of the pump group can both be on the same horizontal plane and 15 both be lodged between the matching edges of the shells forming the body when the latter is closed, or on a vertical plane and facing towards the top face of the body or shell, always and consequently with the possibility of automizable assembly of the group.

In a further embodiment such as the one shown in Fig. 9, the body 11 20 can be configured to form a tool holder compartment 38 closed by a cover 39, and the inlet 22 and outlet 23 air ducts of the pump group can be placed side by side across a wall of said compartment so as to be accessed through the latter.